CLAIMS

What is claimed:

1. A method for fabricating polymer microparticles, comprising the steps of:

(a) coating a polymer stamp with a polymeric solution to create a continuous layer of polymer on said stamp, wherein said stamp further comprises a plurality of microstructures on at least one side of said stamp for receiving said polymeric solution, and wherein said microstructures further comprise a plurality of micro-pillars and a plurality of micro-wells;

(b) removing said layer of polymer from said micro-pillars;

(c) creating polymer microparticles by transferring said layer of polymer from said micro-wells onto a substrate, wherein said substrate further comprises a layer of dissolvable material covering said substrate;

(d) applying a thin layer of oil to said substrate to selectively cover said microparticles; and

(e) placing said substrate in a solvent to dissolve said dissolvable material and release said microparticles into solution.

2. The method of claim 1, wherein said stamp is a polydimethyl siloxane stamp.

3. The method of claim 1, wherein said polymeric solution further comprises poly (propyl methacrylate).

4. The method of claim 1, wherein said substrate is a glass slide.

5. The method of claim 1, wherein said layer of dissolvable material further comprises chitosan.

6. The method of claim 1, wherein said oil further comprises food-grade soybean oil.

7. The method of claim 1, wherein said solvent further comprises acetic acid.

8. A method for fabricating polymer microparticles, comprising the steps of:

(a) coating a polymer stamp with a partially cured liquid hydrogel precursor, wherein said stamp further comprises a plurality of microstructures on at least one side of said stamp for receiving said hydrogel precursor, and wherein said microstructures further comprise a plurality of micro-pillars and a plurality of micro-wells;

(b) completely curing said partially cured liquid hydrogel precursor to create a substantially solid hydrogel in said micro-wells;

(c) creating hydrogel microparticles by transferring said cured hydrogel from said micro-wells onto a substrate, wherein said substrate further comprises a layer of dissolvable material covering said substrate; and

(d) placing said substrate in a solvent to dissolve said dissolvable material and release said microparticles into solution.

9. The method of claim 8, wherein said stamp is a polydimethyl siloxane stamp.

10. The method of claim 8, wherein said hydrogel solution further comprises polyhydroxyethyl methacrylate or polymethacrylic acid.

11. The method of claim 8, wherein said substrate is a glass slide.

12. The method of claim 8, wherein said layer of dissolvable material further comprises polyvinyl alcohol.

13. The method of claim 8, wherein said solvent further comprises water and a buffer solution.

14. A method for fabricating polymer microparticles, comprising the steps of:

(a) coating a polymer stamp with a partially cured liquid hydrogel precursor, wherein said stamp further comprises a plurality of microstructures on at least one side of said stamp for receiving said hydrogel precursor, and wherein said microstructures further comprise a plurality of micro-pillars and a plurality of micro-wells;

(b) completely curing said partially cured liquid hydrogel precursor to create a substantially solid hydrogel in said micro-wells;

(c) coating said stamp with a second polymeric solution to create a continuous layer of polymer on said stamp;

(d) removing said layer of polymer from said micro-pillars;

(e) creating bi-layer polymer microparticles by transferring said polymers from said micro-wells onto a substrate, wherein said substrate further comprises a layer of dissolvable material covering said substrate; and

(f) placing said substrate in a solvent to dissolve said dissolvable material and release said bilayer microparticles into solution.

15. The method of claim 14, wherein said stamp is a polydimethyl siloxane stamp.

16. The method of claim 14, wherein said hydrogel and second polymer solution further comprise polymethacrylic acid and polylactic-co-glycolic acid, respectively.

17. The method of claim 14, wherein said substrate is a glass slide.

18. The method of claim 14, wherein said layer of dissolvable material further comprises polyvinyl alcohol.

19. The method of claim 14, wherein said solvent further comprises water.